

What is claimed is:

1. A method for removing dye from polyester comprising:
  - a) contacting the polyester with a dye removal composition comprising an aqueous solution of at least one leveling agent to form a mixture;
  - b) heating the mixture until it reaches an elevated temperature and a pressure higher than the equilibrium pressure of the dye removal composition at the elevated temperature;
  - c) maintaining the mixture at the elevated temperature and pressure for a time interval sufficient to at least partially remove dye from the polyester;
  - d) cooling the mixture;
  - e) separating the polyester from the mixture; and
  - f) removing any residual dye removal composition from the polyester.
2. The method of claim 1 wherein the dye removal composition further comprises at least one chemical selected from the group consisting of scouring agents, wetting agents and leveling carriers.
3. The method of claim 1 wherein the leveling agent is selected from the group consisting of anionic leveling agents, nonionic leveling agents and mixtures thereof.

4. The method of claim 3 wherein the leveling agent is selected from the group consisting of alkyl polyglycol ether, isopropyl alcohol, n-butyl phthalimide, nonyl phenol ethoxylate and combinations thereof.
5. The method of claim 2 wherein the scouring agent or wetting agent is nonionic.
6. The method of claim 5 wherein the nonionic scouring agent or wetting agent is selected from the group consisting of polyoxyethylene ethers.
7. The method of claim 2 wherein the leveling carrier comprises a nonionic leveling carrier.
8. The method of claim 7 wherein the nonionic leveling carrier comprises alkyl phthalimide.
9. The method of claim 2 wherein the dye removal composition comprises isopropyl alcohol, n-butyl phthalimide, nonyl phenol ethoxylate, propylene glycol ether and combinations thereof.
10. The method of claim 1 wherein the dye removal composition comprises an aqueous solution of about 0.5 wt% to about 8.0 wt% of leveling agent, based on the total dye removal composition.
11. The method of claim 10 wherein the dye removal composition comprises an aqueous solution of about 2.0 wt% to about 8.0 wt% of leveling agent, based on the total dye removal composition.

12. The method of claim 11 wherein the dye removal composition comprises an aqueous solution of about 4.0 wt% to about 8.0 wt% leveling agent, based on the total dye removal composition.
13. The method of claim 1 wherein the mixture is agitated for about 120 minutes during one or more of the contacting, heating or maintaining steps.
14. The method of claim 1 wherein the mixture is maintained at a pressure of about 28 psi to about 39 psi.
15. The method of claim 14 wherein the mixture is maintained at a pressure of about 33 psi.
16. The method of claim 1 wherein the mixture is heated to a temperature of from about 135°C to about 145°C.
17. The method of claim 16 wherein the mixture is maintained at the elevated temperature about 140°C.
18. The method of claim 1 wherein the mixture is maintained at the elevated temperature for a period of about 30 minutes to about 60 minutes.
19. The method of claim 18 wherein the mixture is maintained at the elevated temperature for about 45 minutes.
20. The method of claim 1 wherein the mixture is cooled over a period of about 20 minutes to about 40 minutes.

21. The method of claim 1 wherein the mixture is cooled to a temperature of about 20°C to about 50°C.
22. The method of claim 21 wherein the mixture is cooled to a temperature of about 30°C.
23. The method of claim 1 wherein the polyester comprises polyester obtained from panel fabric.
24. The method of claim 23 wherein the panel fabric has been garnetted into loose fibers.
25. The method of claim 1 wherein the method is carried out in a sealable vessel.
26. The method of claim 1 wherein the method is carried out as a batch process.
27. The method of claim 1 wherein the polyester comprises poly(ethylene terephthalate) ("PET").
28. A method for removing dye from PET comprising:
  - a) contacting the PET with a dye removal composition comprising an aqueous solution of one or more of propylene glycol ether, isopropyl alcohol, n-butyl phthalimide and nonyl phenol ethoxylatein to form a mixture;
  - b) heating the mixture for about 120 minutes;

- c) maintaining the temperature of the mixture at about 140°C and the pressure at about 33 psi for a time sufficient to at least partially remove dye from the PET;
  - d) cooling the mixture to 30°C over a period of about 20 minutes to 40 minutes;
  - e) separating the PET from the mixture; and
  - f) rinsing the PET with water.
29. A composition for removing dye from polyester comprising an aqueous solution of about 2.0 wt% to about 8.0 wt% of at least one leveling agent, based on the total composition.
30. The composition of claim 29 wherein the composition comprises an aqueous solution of about 4.0 wt% to about 8.0 wt% of leveling agent, based on the total composition.
31. The composition of claim 29 further comprising at least one chemical selected from the group consisting of scouring agents, wetting agents and leveling carriers.
32. The composition of claim 29 further comprising at least one leveling agent selected from the group consisting of anionic leveling agents, nonionic leveling agents and mixtures thereof.
33. The composition of claim 32 wherein the leveling agent is selected from the group consisting of alkyl polyglycol ether, isopropyl alcohol, n-butyl phthalimide and nonyl phenol ethoxylate.

34. The composition of claim 31 wherein the scouring agent or wetting agent is nonionic.
35. The composition of claim 34 wherein the nonionic scouring agent or wetting agent is selected from the group consisting of polyoxyethylene ethers.
36. The composition of claim 31 wherein the leveling carrier comprises a nonionic leveling carrier.
37. The composition of claim 36 wherein the nonionic leveling carrier comprises alkyl phthalimide.
38. The composition of claim 31 wherein the composition comprises isopropyl alcohol, n-butyl phthalimide, nonyl phenol ethoxylate, and propylene glycol ether.
39. The composition of claim 29 wherein the polyester comprises PET.
40. A device for removing dye from polyester, comprising:  
a sealable vessel; and  
a dye removal composition disposed therein, the dye removal composition comprising an aqueous solution of about 2.0 wt% to about 8.0 wt% of at least one leveling agent, based on the total dye removal composition.
41. The device of claim 40, wherein the dye removal composition comprises an aqueous solution of about 4.0 wt% to about 8.0 wt% leveling agent.

42. The device of claim 40 wherein the dye removal composition further comprises at least one chemical selected from the group consisting of scouring agents, wetting agents and leveling carriers.
43. The device of claim 40 wherein the dye removal composition comprises at least one leveling agent selected from the group consisting of anionic leveling agents, nonionic leveling agents and mixtures thereof.
44. The device of claim 43 wherein the dye removal composition comprises at least one leveling agent selected from the group consisting of alkyl polyglycol ether, isopropyl alcohol, n-butyl phthalimide and nonyl phenol ethoxylate.
45. The device of claim 42 wherein the scouring agent or wetting agent is nonionic.
46. The device of claim 45 wherein the nonionic scouring agent or wetting agent is selected from the group consisting of polyoxyethene ethers.
47. The device of claim 42 wherein the leveling carrier comprises a nonionic leveling carrier.
48. The device of claim 47 wherein the nonionic leveling carrier comprises alkyl phthalimide.

49. The device of claim 40 wherein the dye removal composition comprises one or more of isopropyl alcohol, n-butyl phthalimide, nonyl phenol ethoxylate and propylene glycol ether.
50. The device of claim 40 wherein the polyester comprises PET.
51. A method for recycling panel fabric comprising polyester, the method comprising:
- a) removing from the fabric any structural elements;
  - b) removing dye from the fabric using the method of claim 1;
  - c) recovering the polyester;
  - d) melting the polyester;
  - e) pelletizing the melted polyester; and
  - f) extruding the resulting pellets into full-length fiber.
52. The method of claim 51 wherein the contacting takes place in a sealable vessel and the residual dye removal composition is removed by rinsing with water.
53. The method of claim 51 wherein the dye removal composition further comprises at least one chemical selected from the group consisting of scouring agents, wetting agents and leveling carriers.
54. The method of claim 53 wherein the dye removal composition comprises isopropyl alcohol, n-butyl phthalimide, nonyl phenol ethoxylate, and propylene glycol ether.
55. The method of claim 51 wherein the polyester comprises PET.